

Making your own development board.

Hardware Section

In this article, I will show you how to make your own AVR development board for ATmega8 microcontroller.

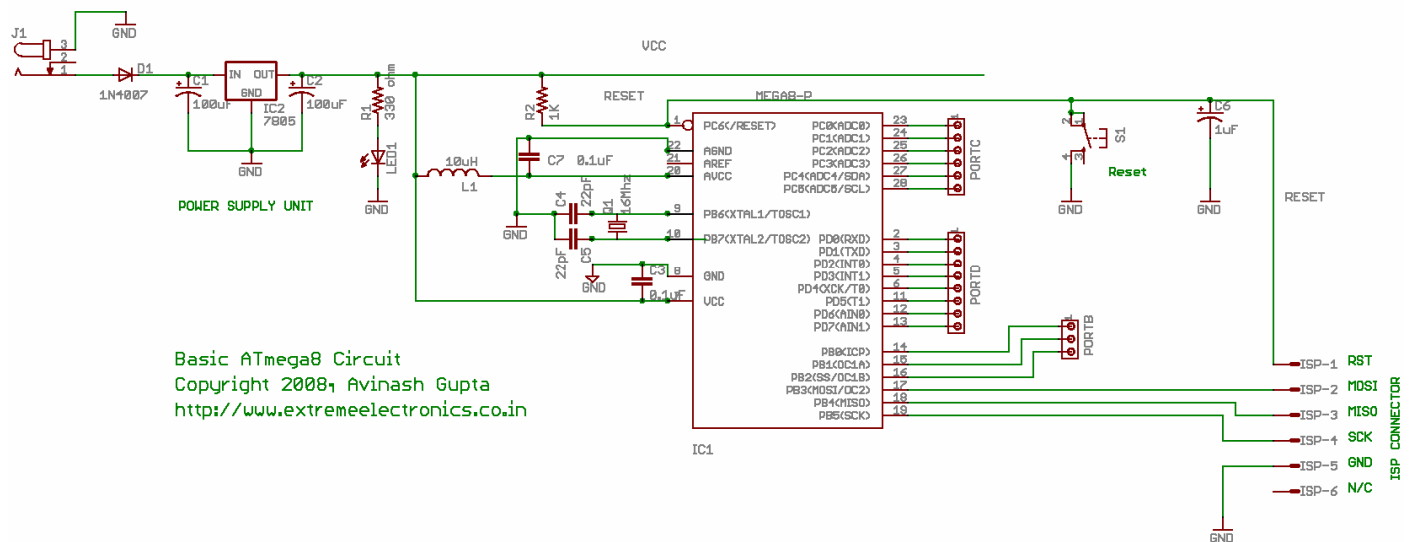
What is a development board?

In order to learn any MCU like AVR we need a AVR MCU that has all the basic connections like power supply, crystal oscillator, proper reset signal and an ISP connector for uploading a program. All these things are required for any project you will make. A development board is a circuit board that contains all these connections and it has connectors for IO pins of MCU so that they can be connected to any external circuit with ease. So as you see its is like a basic framework. Once you make a good development board and test it, you will have a solid foundation and for your project you can concentrate on the specific requirement of that project. This will also reduce the chance of making errors.

Some more complicated development boards have a RS232 level converters(for serial communication) ,motor control chips etc.

Now let's do it!

I have described the basic connections required by any AVR MCU in Part III of my AVR tutorial series so I am jumping right to the schematic.



Development Board schematic

Things you will need are.

S.No	Component	Name	Value
01	ATmega8	IC1	
02	Voltage Regulator IC 7805	IC2	
03	Resistance	R1	330ohm
04	Resistance	R2	1k
05	Capacitor (Electrolytic/Polar)	C1	100uF
06	Capacitor (Electrolytic/Polar)	C2	100uF

07	Capacitor (Electrolytic/Polar)	C6	1uF
08	Capacitor (Ceramic Disk type)	C3	0.1uF
09	Capacitor (Ceramic Disk type)	C4	22pF
10	Capacitor (Ceramic Disk type)	C5	22pF
11	Capacitor (Ceramic Disk type)	C6	0.1uF
12	Inductor	L1	10uH
13	Diode	D1	1N4007
14	Crystal Oscillator	Q1	16Mhz
15	LED	LED1	
16	Tactile push to on Switch	S1	
17	Connectors, IC Socket, Power Jack, General Purpose PCBs, wires etc		

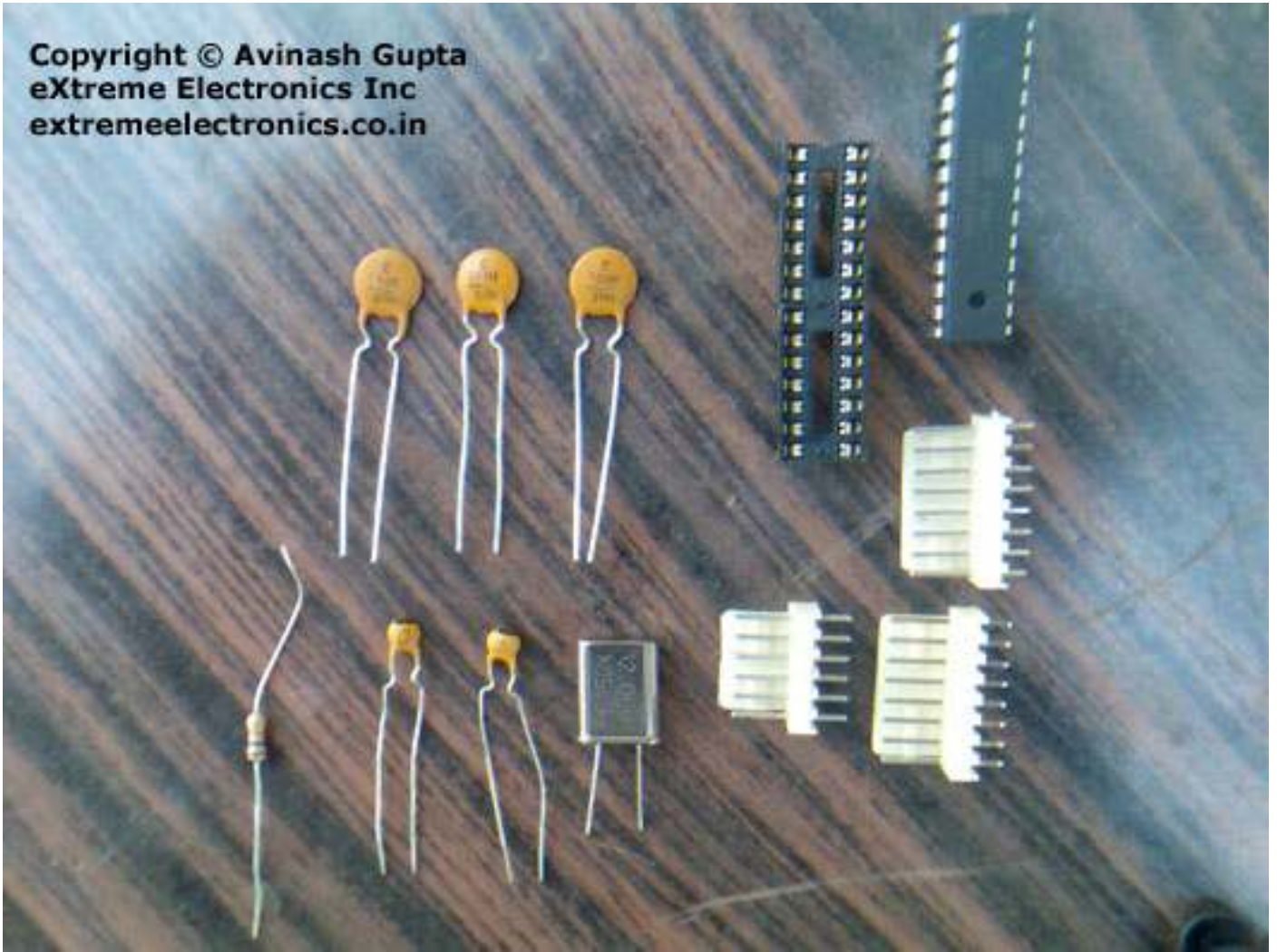
Note

The voltage rating of C1 must be at least **twice** the input voltage while that of C2 & C6 can be **12 Volts or more**

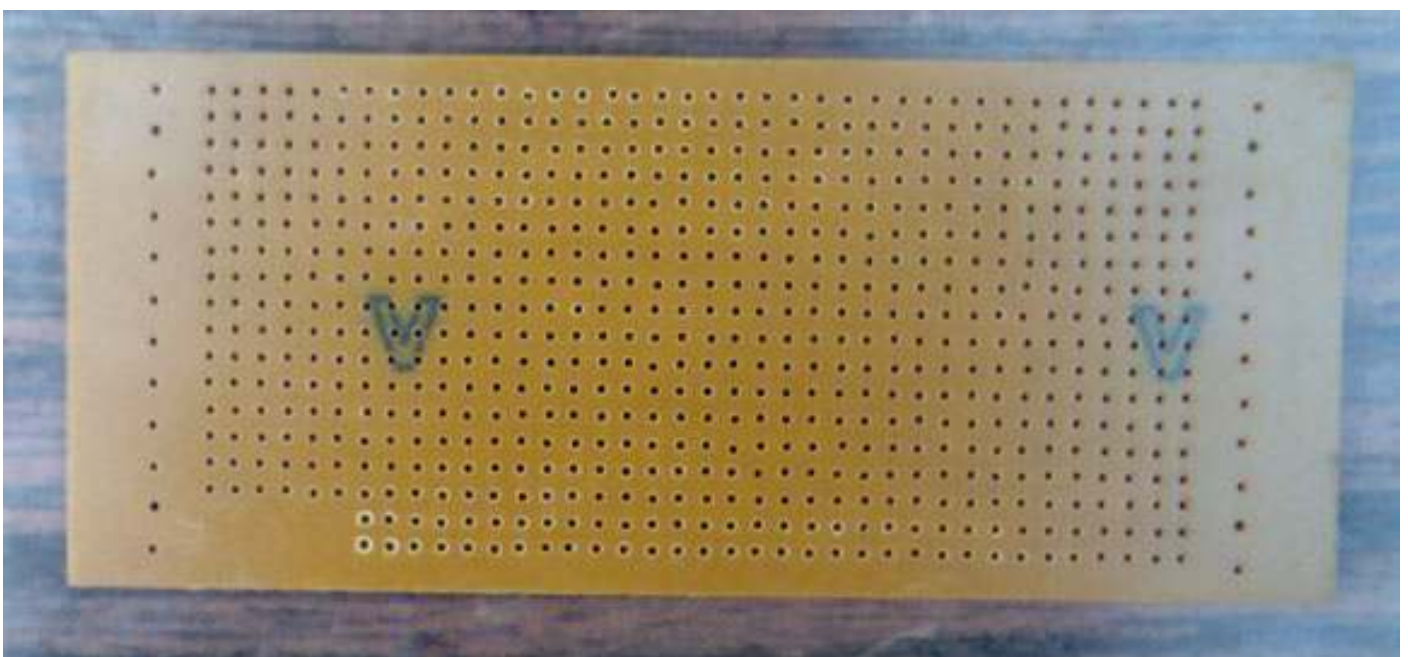


For Power Supply

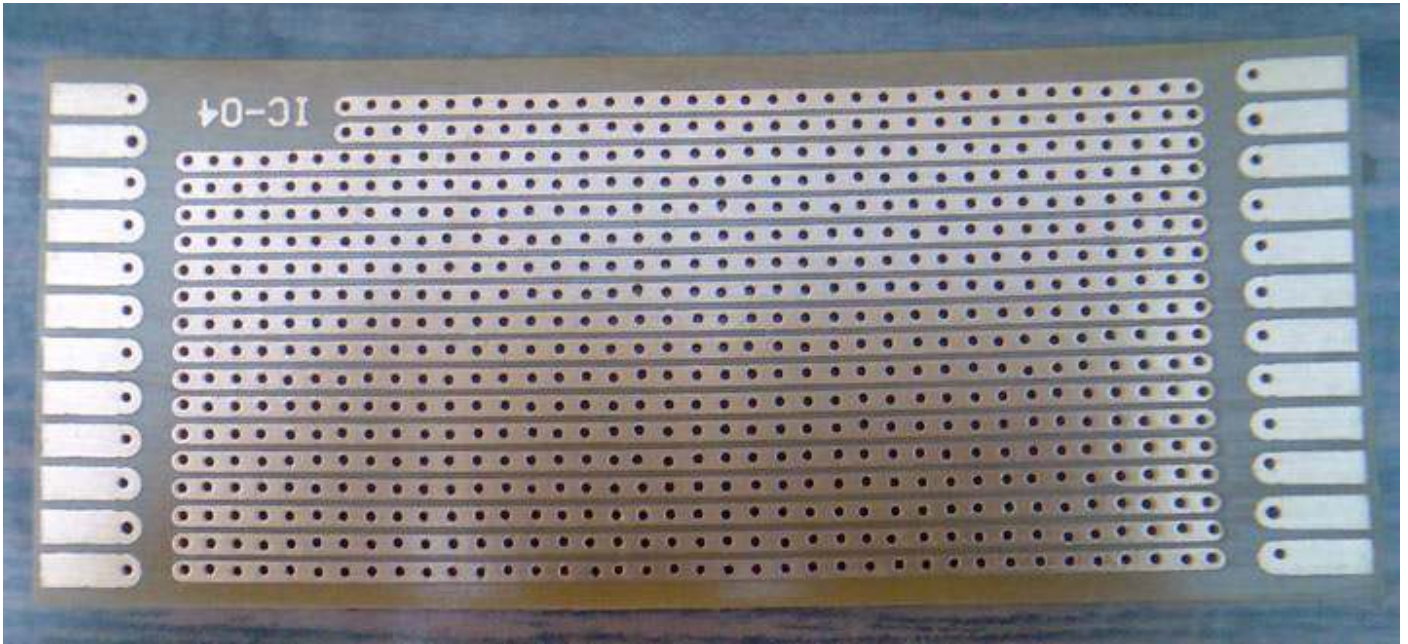
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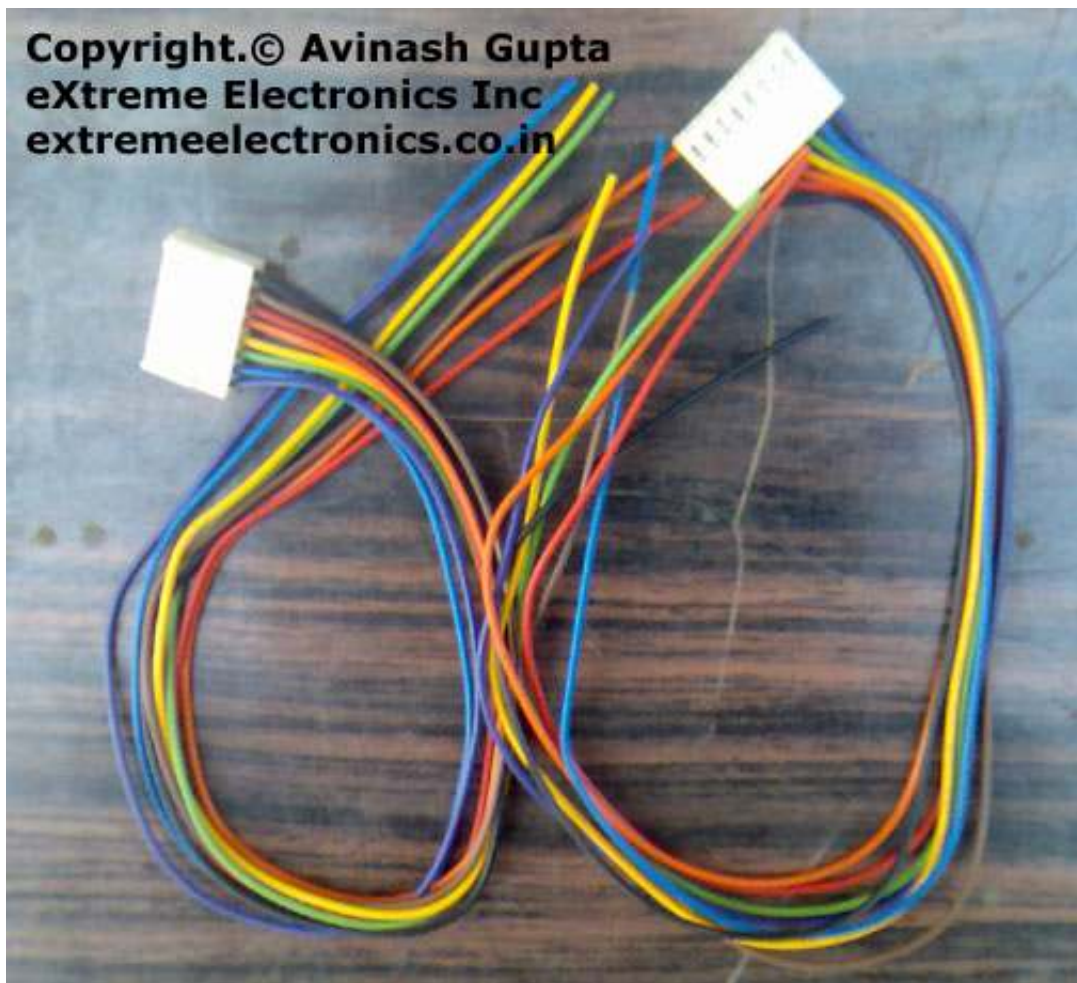
ATmega8, Crystal, Resistor, Capacitor and Connectors



A Vero board (general purpose PCB) – Component Side

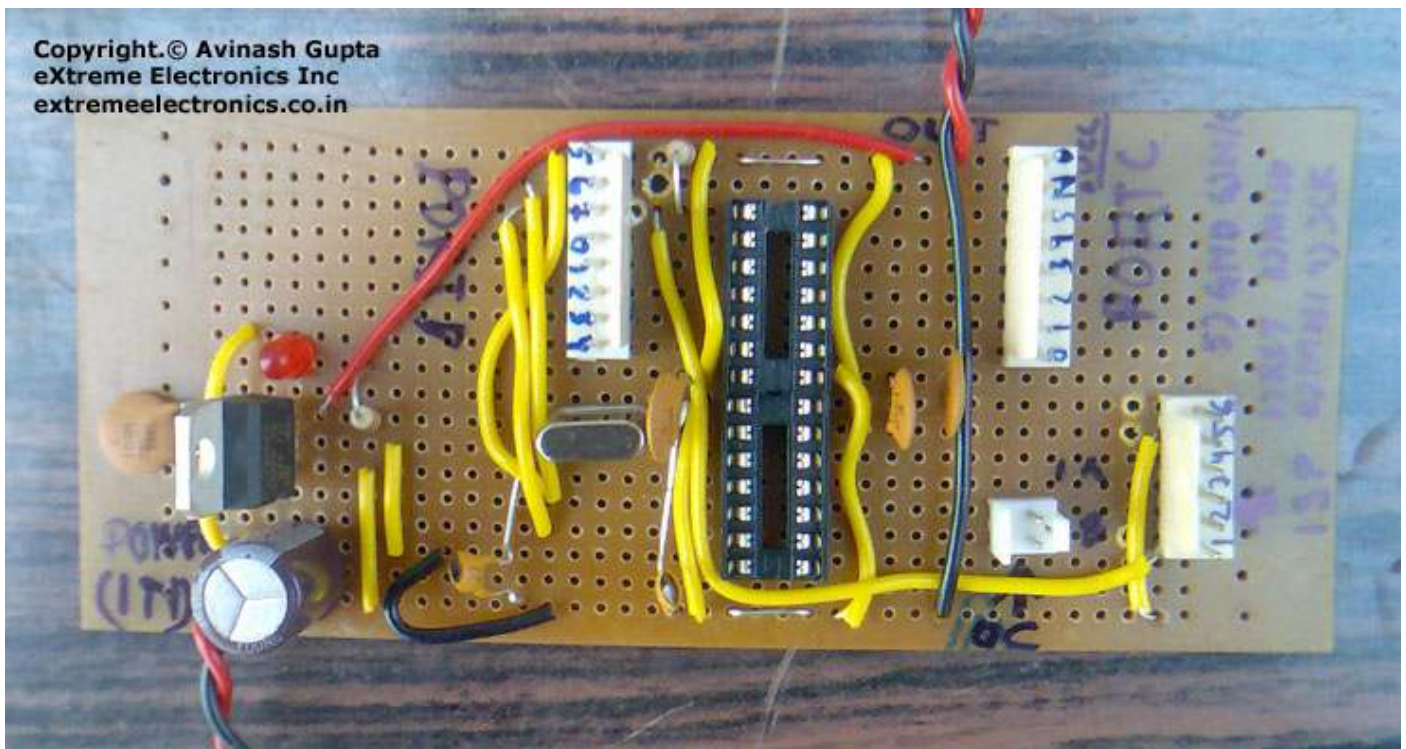
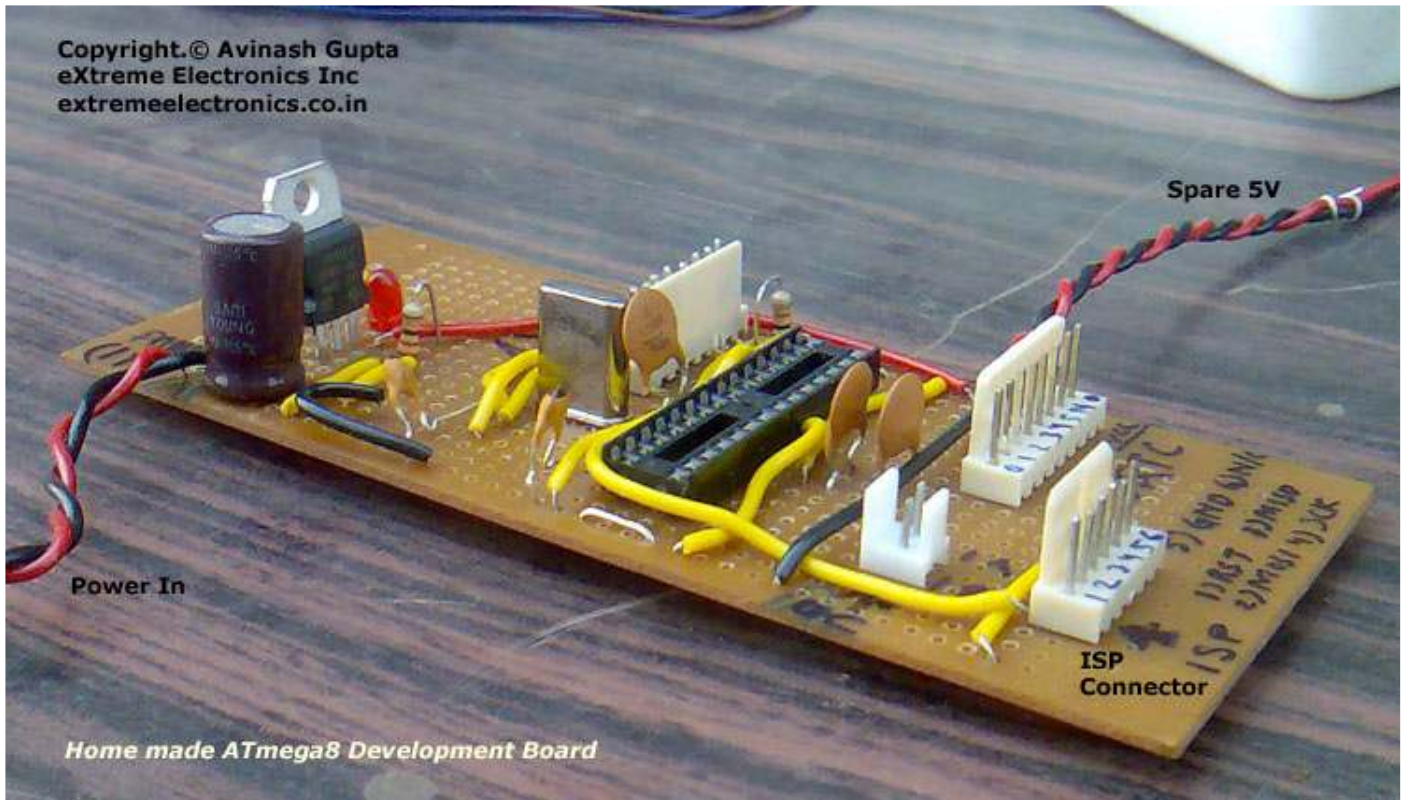


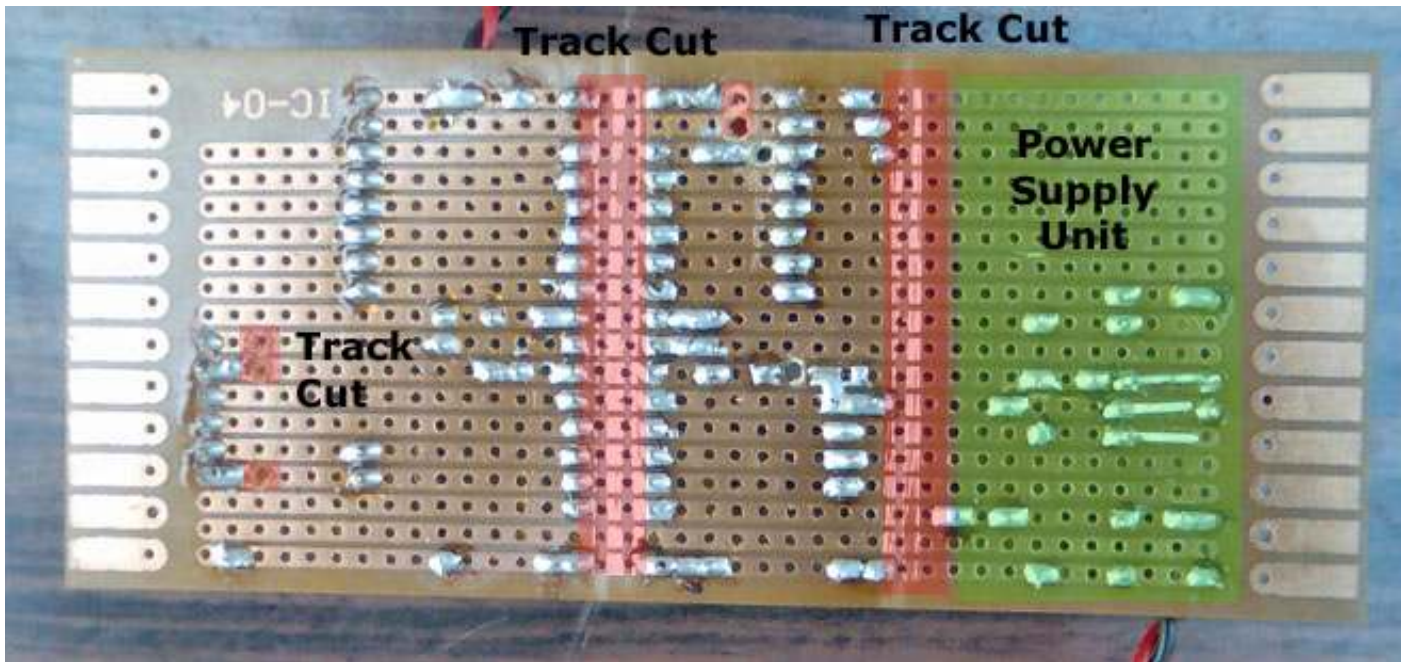
A Vero board (general purpose PCB) – Solder Side



Connectors for easy connecting/disconnecting of MCU IO Pins

Now connect the components according to the schematic on a general purpose PCB. You will get something like this.





The final board with all components assembled

Before inserting the MCU, first test the board for any connection error. Make sure everything is according to the schematic. Then check for any soldering errors like loose joints or unwanted shorting by solder. Finally connect power supply of 8 to 18 volts to the circuit by using an adaptor, battery, or transformer (after converting to DC). Check the power pins of MCU in the IC socket with a multi-meter for voltage. It should be **very close to 5V**. If everything is ok your board is ready.

Note

Some difference in my prototype and the schematic.

- 1) The value of C2 is 100uF but I have used 0.1uF ceramic type.
- 2) I have not used the reverse protection diode D1. But you should for safety.
- 3) I have used 220uF capacitor as C1. Anything over 100uF will do. Also the voltage rating must be double the input supply voltage.
- 4) I have not used the reset switch. However, it is very convenient if we have one.
- 5) I have not used C6(1uF) as it is required for reset switch.
- 6) I have not used L1 for connecting the AVcc to Vcc, instead I have directly connected them. But if you are planning to use the ADC you should use the L1 as it makes the ADC much accurate by suppressing noise.
- 7) I have connected a 0.1uF capacitor from Aref to GND as it is suggested by datasheet. Only necessary if you are using ADC.